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(Still) No Silver Bullets : OBIEE 12c Performance in the Real World

BIWA Summit 2017

Robin Moffatt, Rittman Mead

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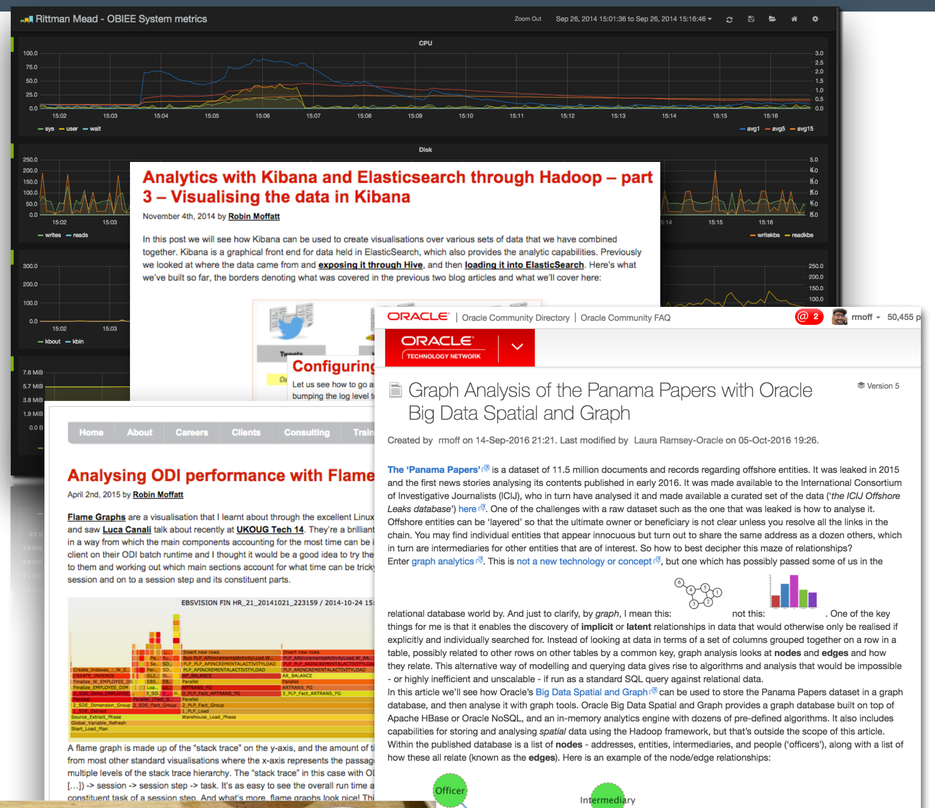
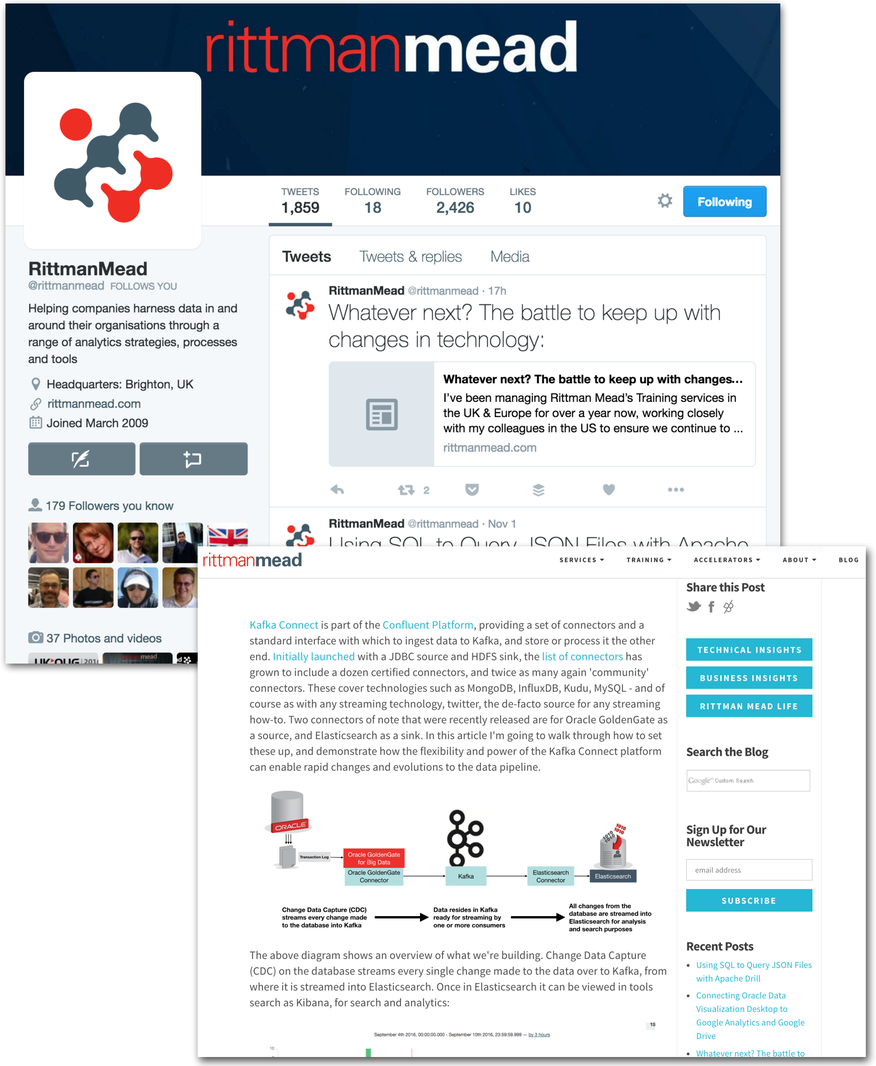
  - Previously SQL Server DBA, Business Objects, DB2, COBOL….
- Oracle ACE
- Frequent blogger : http://ritt.md/rmoff and http://rmoff.net
- Twitter: @rmoff
- IRC: rmoff / #obihackers / freenode



Rittman Mead

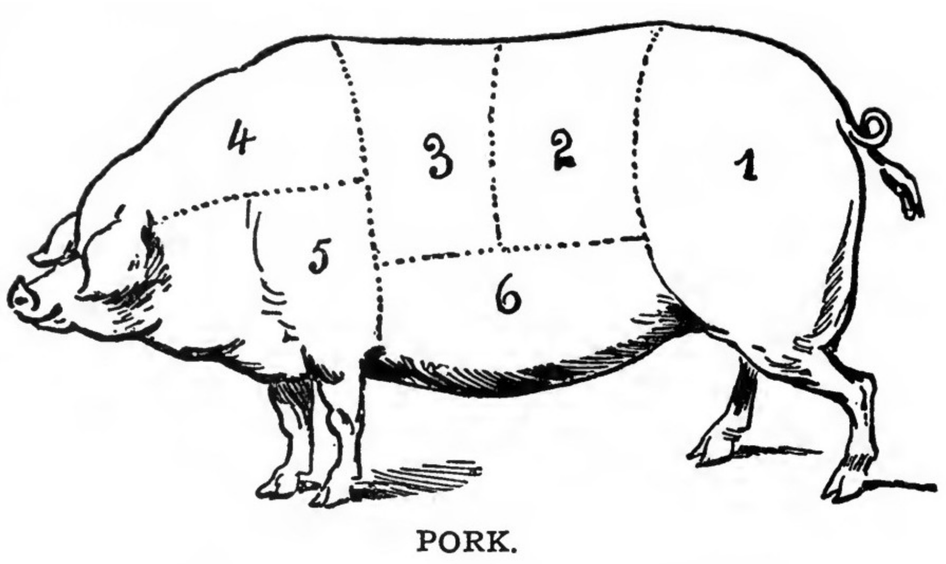
- Oracle Gold Partner with offices in the UK and USA
- 70+ staff delivering Oracle BI, DW, Big Data and Advanced Analytics projects
- Significant web presence with the Rittman Mead Blog (http://www.rittmanmead.com)
- Hadoop R&D lab for “dogfooding” solutions developed for customers



OBIEE Performance in the Real World

- Do It Right, First Time
  - What Makes A Performant OBIEE System?

- If It's Not Done Right, Know How To Figure Out What Is Broke
  - Practical elements of diagnosing the causes of performance issues
  - Methodical analysis - "**nose to tail**"



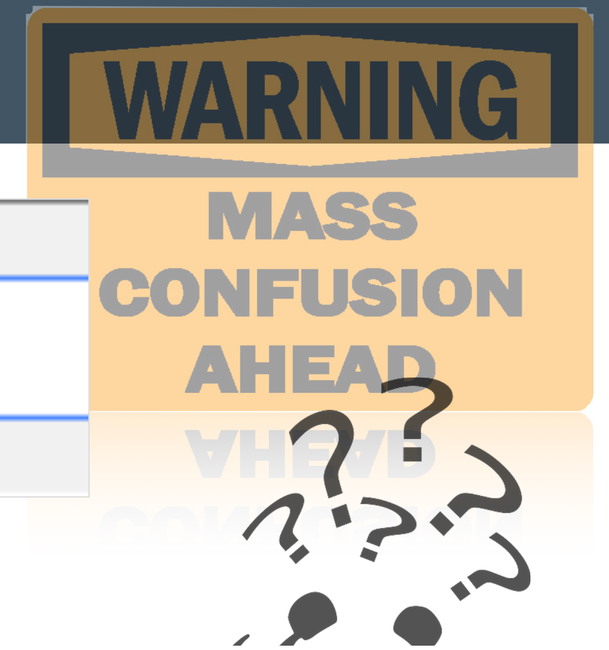
The Requirement

The Problem

- Lots of moving parts and complexity

- Overall solution crosses disciplines and job roles
  - OBIEE developer
  - Database developer
  - DBA
  - Server Admin
  - Network
  - SAN
  - LDAP
  - etc

The *Additional* Problem



Google obiee performance best practices

Steps to improve the performance.

1. As explained by Ahmed, you should start to increase the number of connection pool. I would NOT suggest to put 500. Orale is suggesting a maximum capacity of 150 for OBIEE 11.1.1.7. Ot

2. You should also check once you solve the connection pool issue to

3. You could also increase the PARALLEL_MAX_SERVERS database s

9. alter the NQSONFIG.ini parameters

Performance Beyond the “Best Practices”

- Tear down the reliance on “Best Practice”, but **with a viable, better, alternative instead.**

The *Only* Answer

EVIDENCE-BASED DESIGN AND DIAGNOSTICS

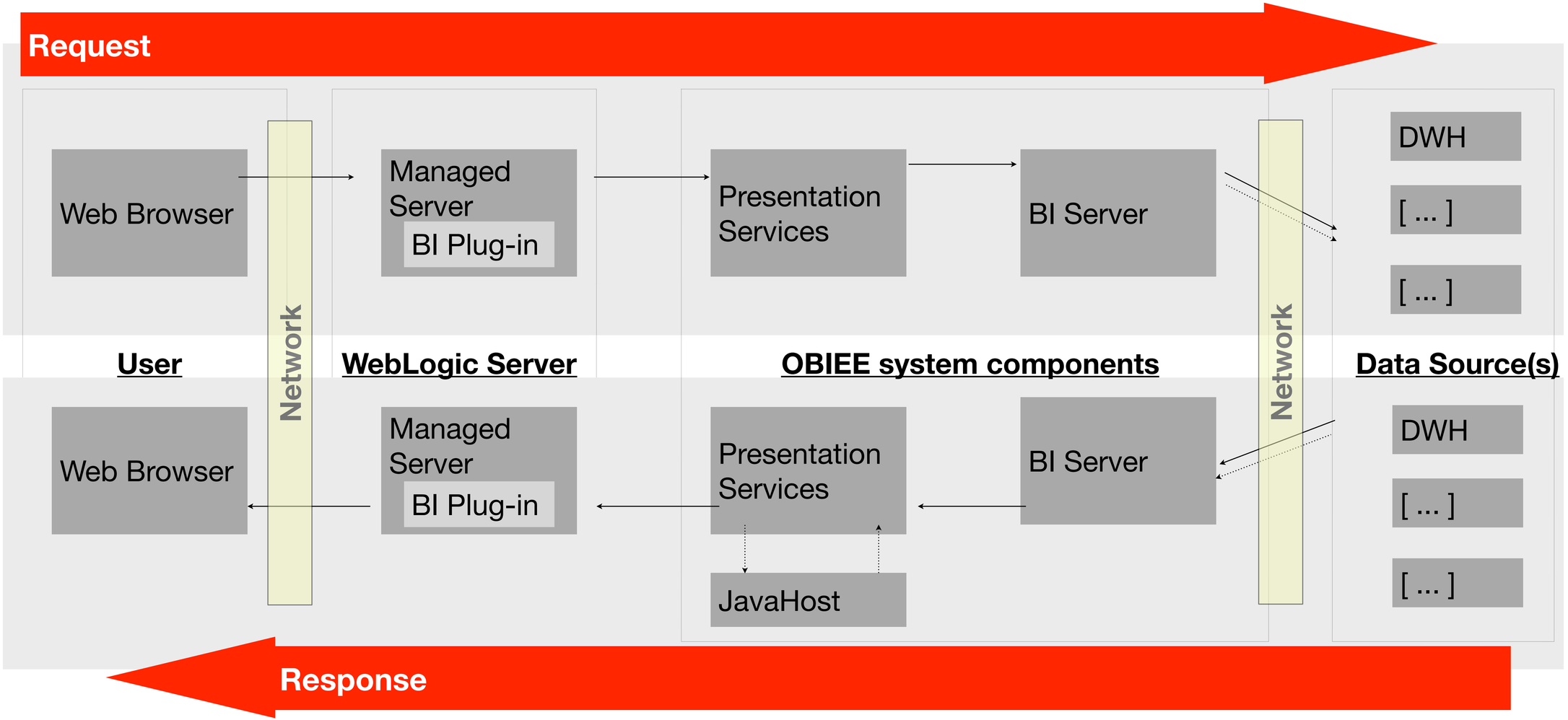
Time Profile

- To understand **why** is it slow, we first must understand **where** is it slow

- Approach championed by Cary Millsap / Method-R
  - *"Thinking Clearly About Performance" (2010)*

> ***Performance improvement is proportional to how much a program uses the thing you improved.***
>
> *— Amdahl's Law*

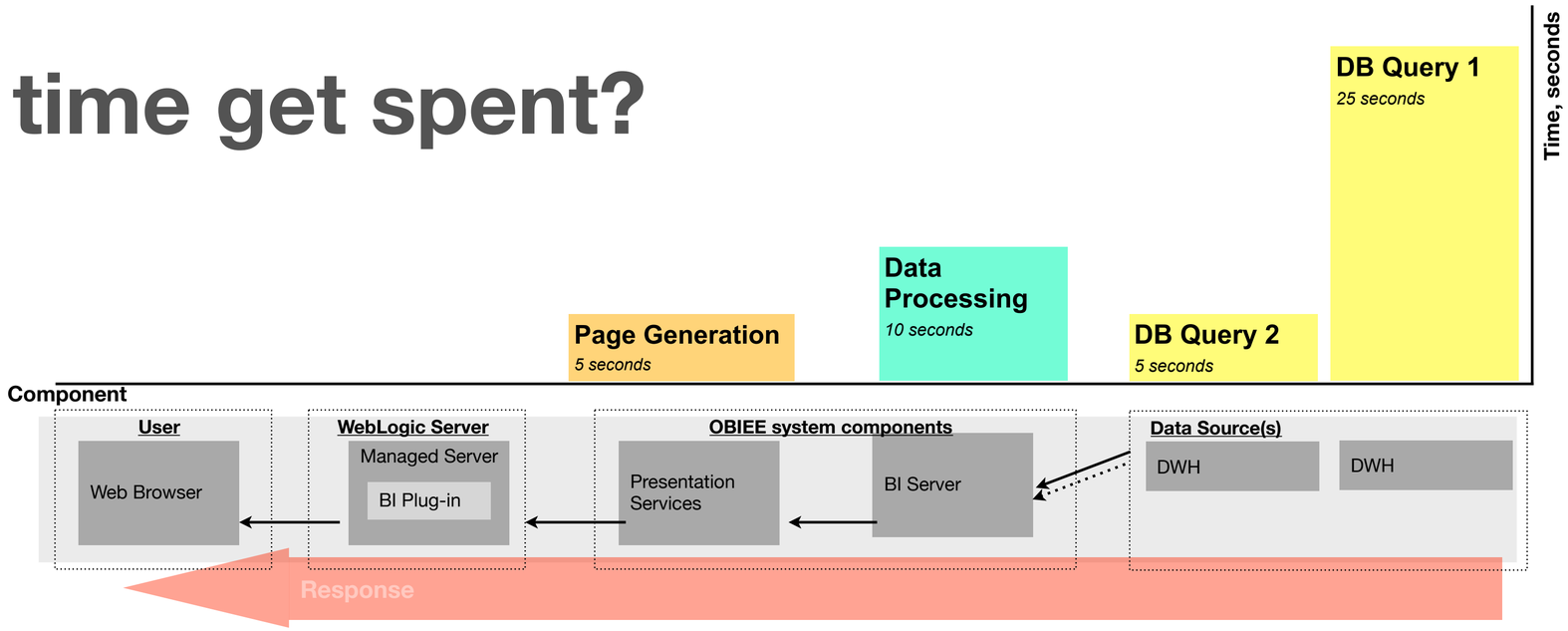
The OBIEE stack



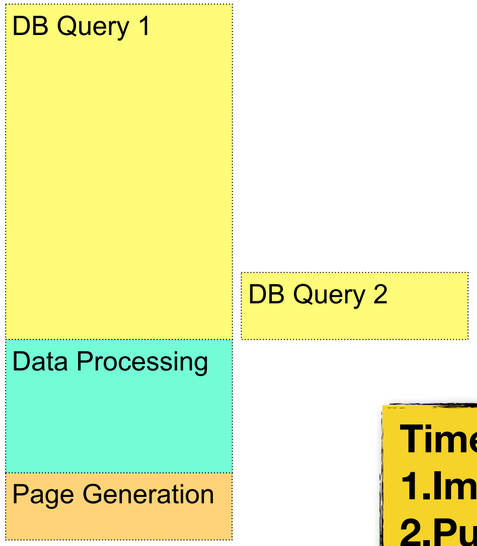
Time Profile in Action

- End-user reports a response time of 40 seconds.
- How can we make it faster?

- **Where did the time get spent?**



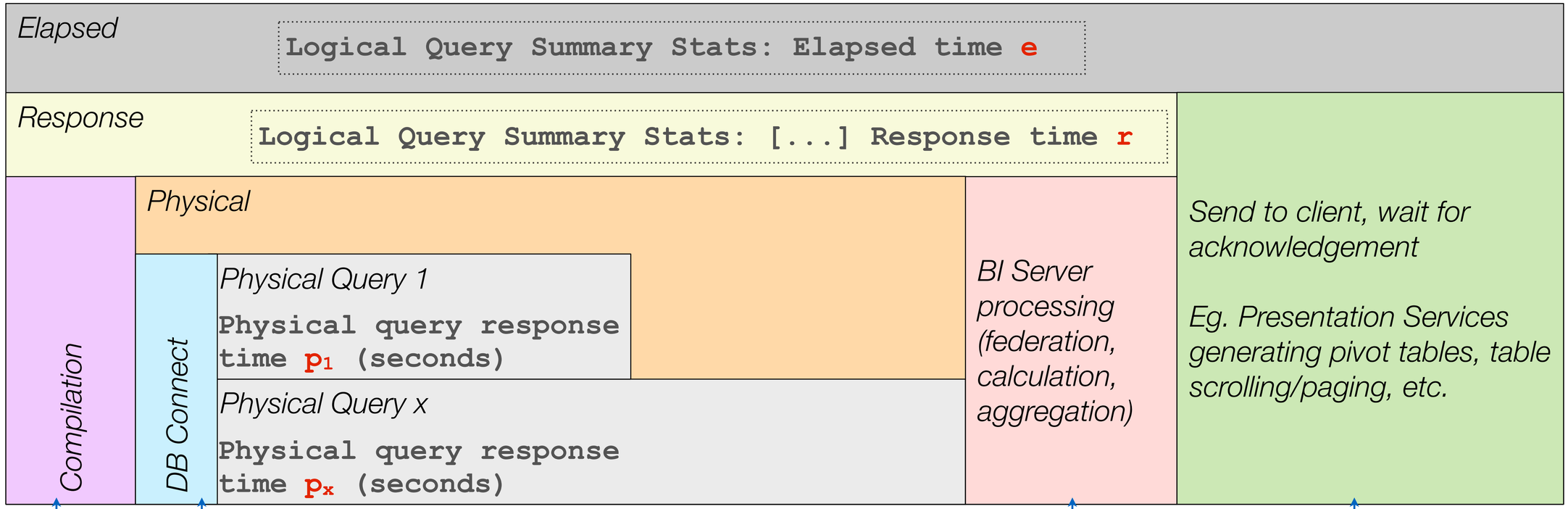
Time Profile in Action



Step	Action	Response Time (s)	%
1	Physical SQL 1 execute on DB	25.00	62.5
2	Physical SQL 2 execute on DB	[5.00]	—
3	BI Server does work on DB results	10.00	25.0
4	Presentation Services generates page	5.00	12.5
	Total	40.00	100.0

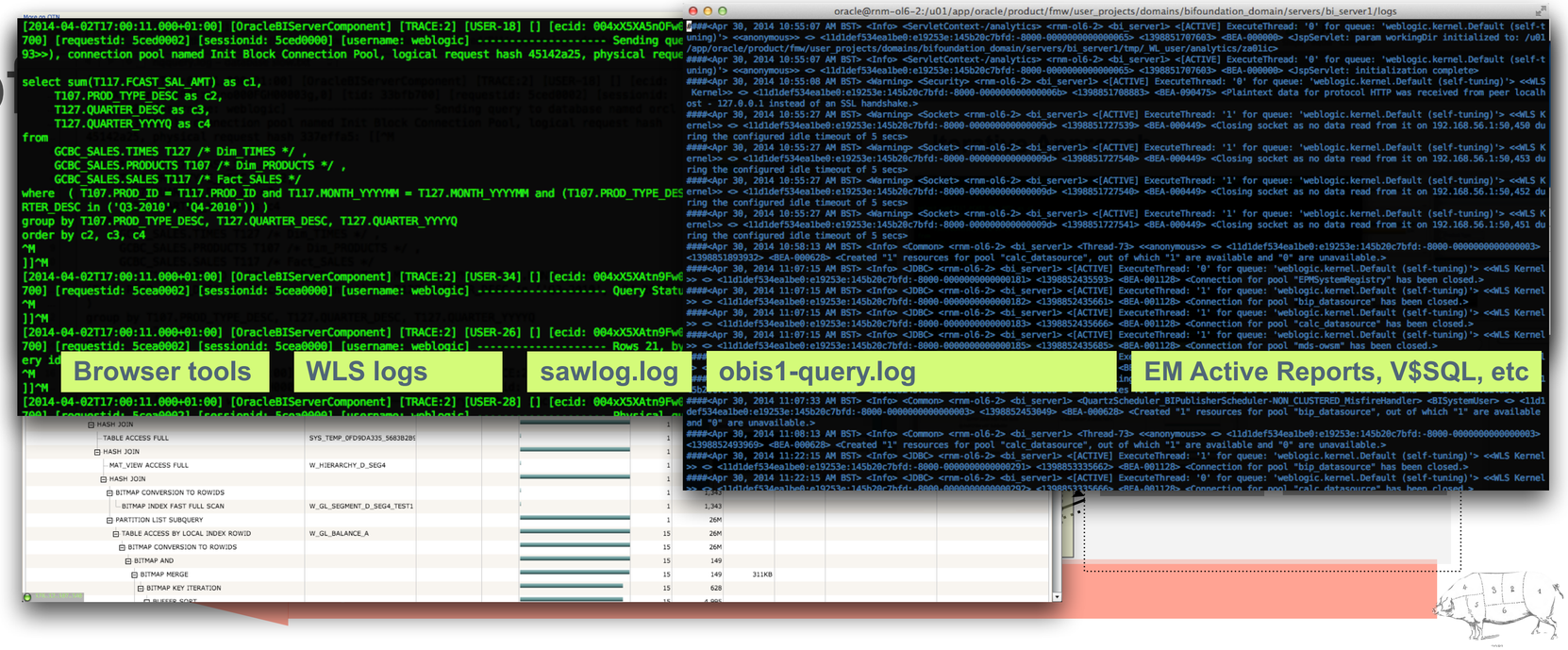
Time profile shows clearly :
1.Improve performance of Query 1
2.Push work into single query

Deep Dive into BI Server Time from obis1-query.log



Iterative Approach

- Be sure to account for all time, end-to-end (nose to tail)
- Expand time profile to focus on where the time is going in particular
- In reality, time pro
  lot of cases

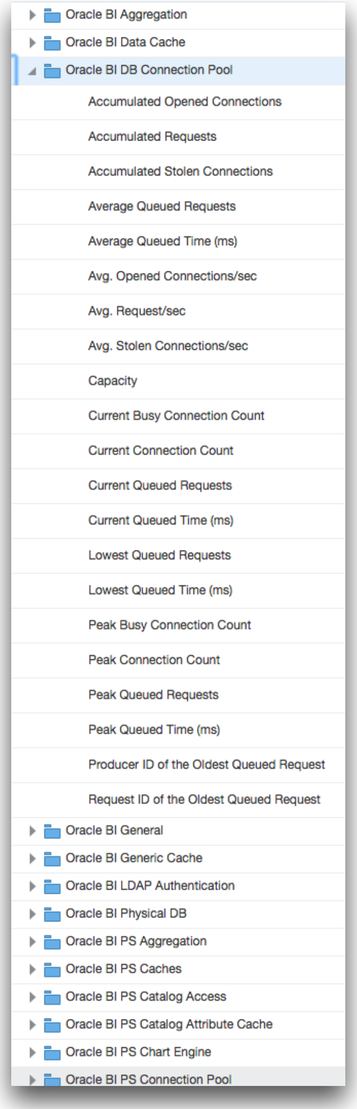


Digging Deeper with DMS Metrics

- OBIEE supports Fusion Middleware's Dynamic Monitoring System (**DMS**)

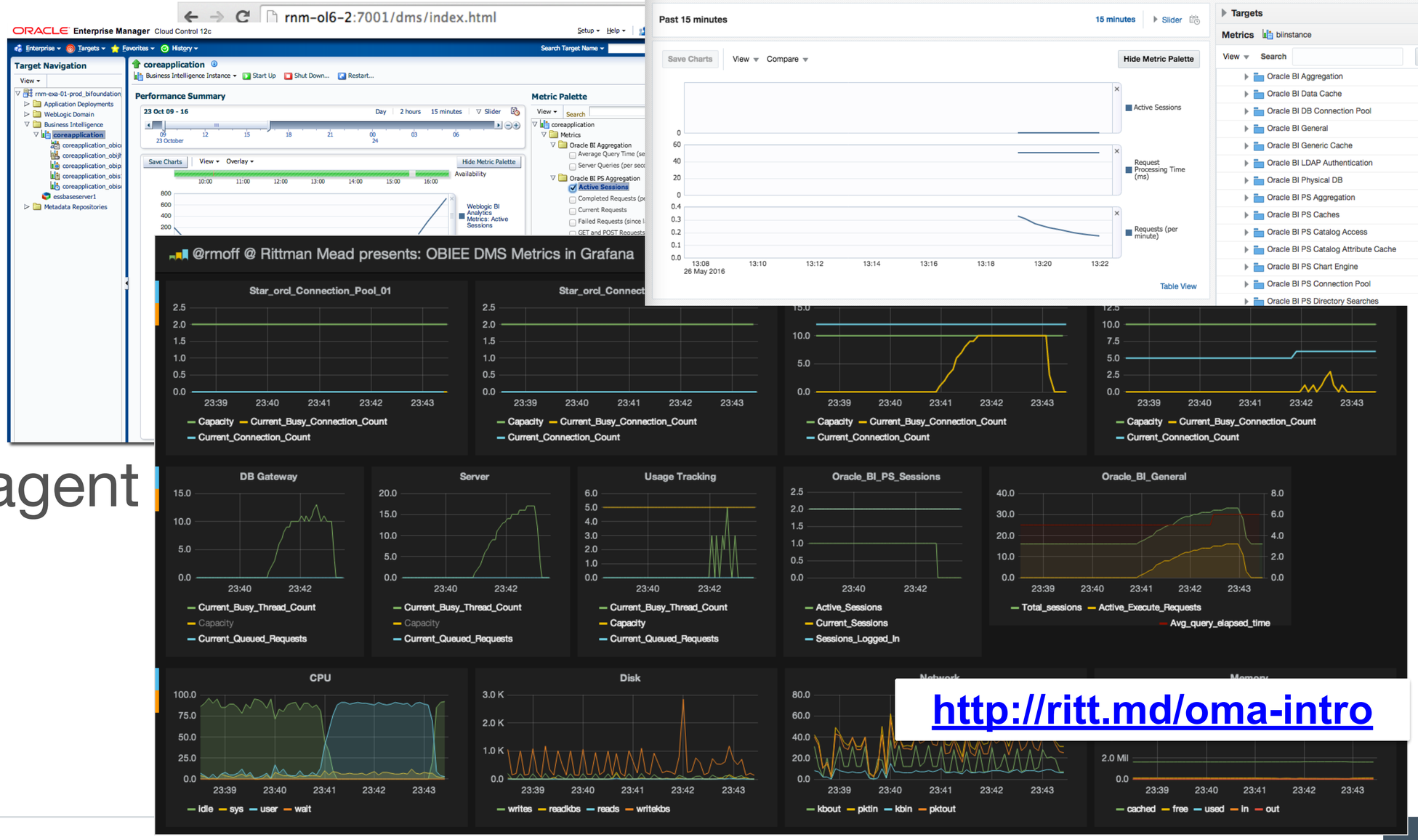
- Once we have found WHERE the time has gone, DMS metrics are one way to help us find out WHY

- Hundreds of low-level metrics, ranging from the obvious (`BI Server Total Sessions`)
  to the less obvious
  (`Peak_DXEParameterizedImpl_Count`)



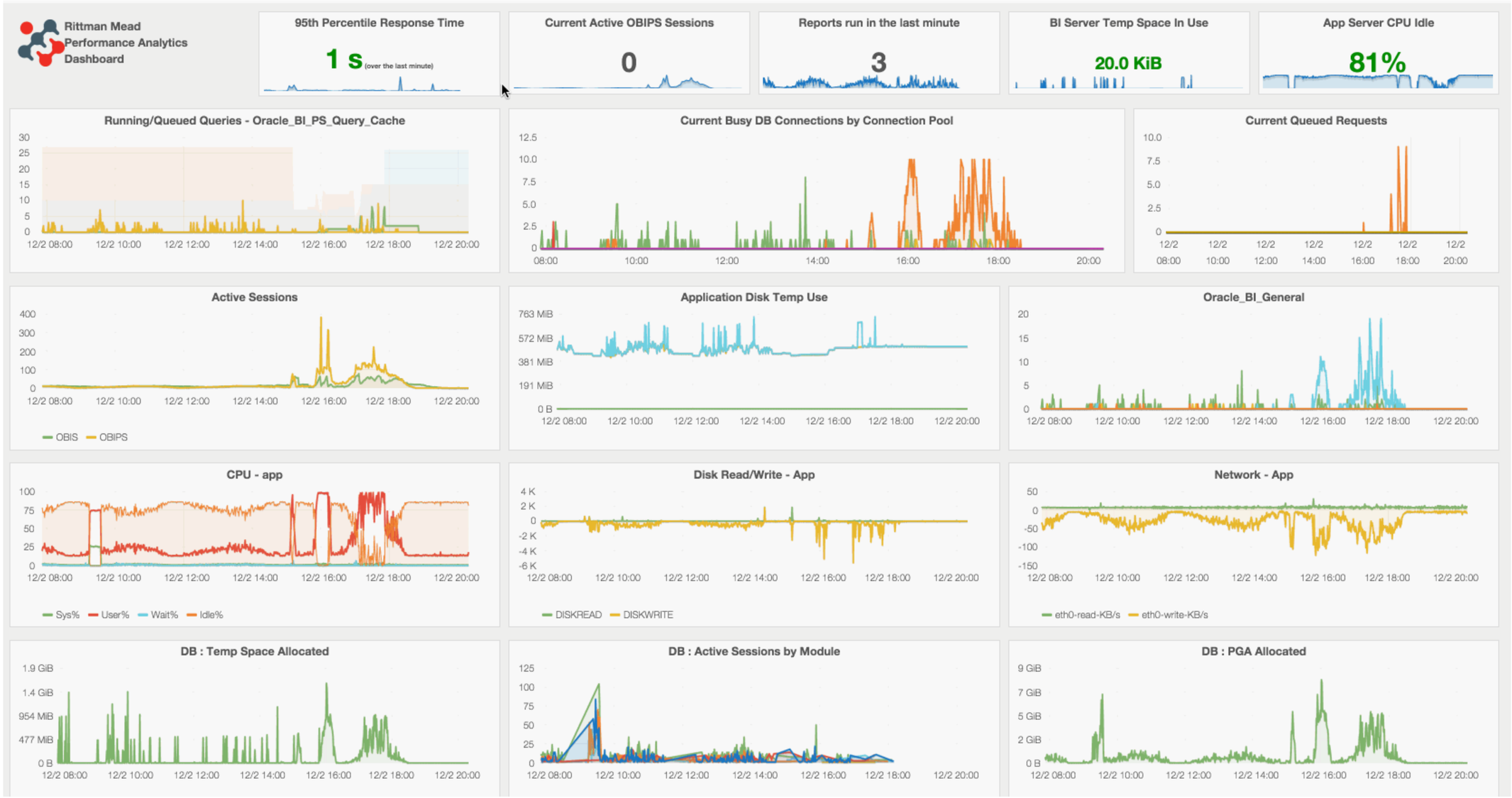
Accessing DMS Metrics

- DMS Spy
- WLST
- EM FMC
- EM12c
- obi-metrics-agent



http://ritt.md/oma-intro

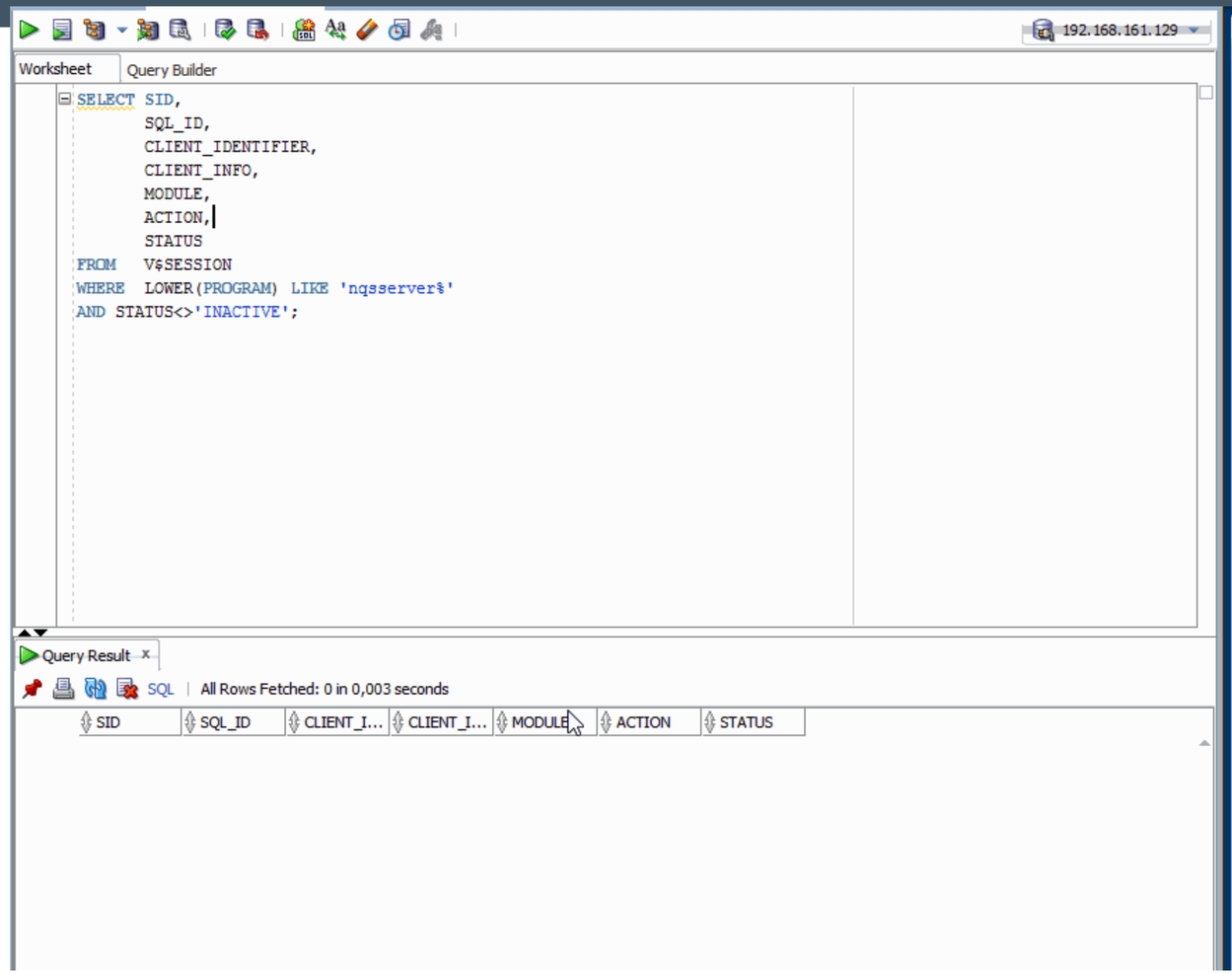
Full Stack Performance Analysis for OBIEE

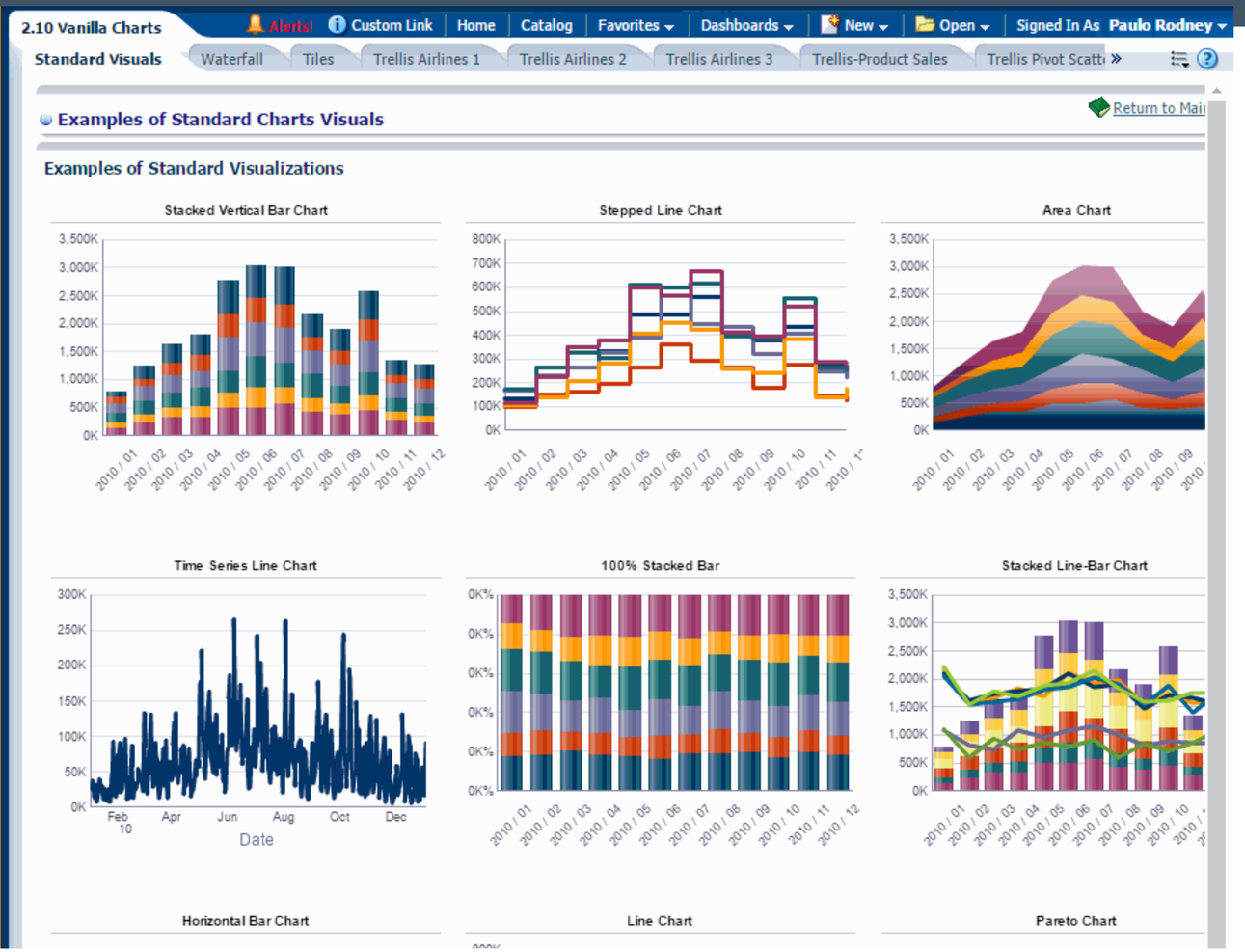


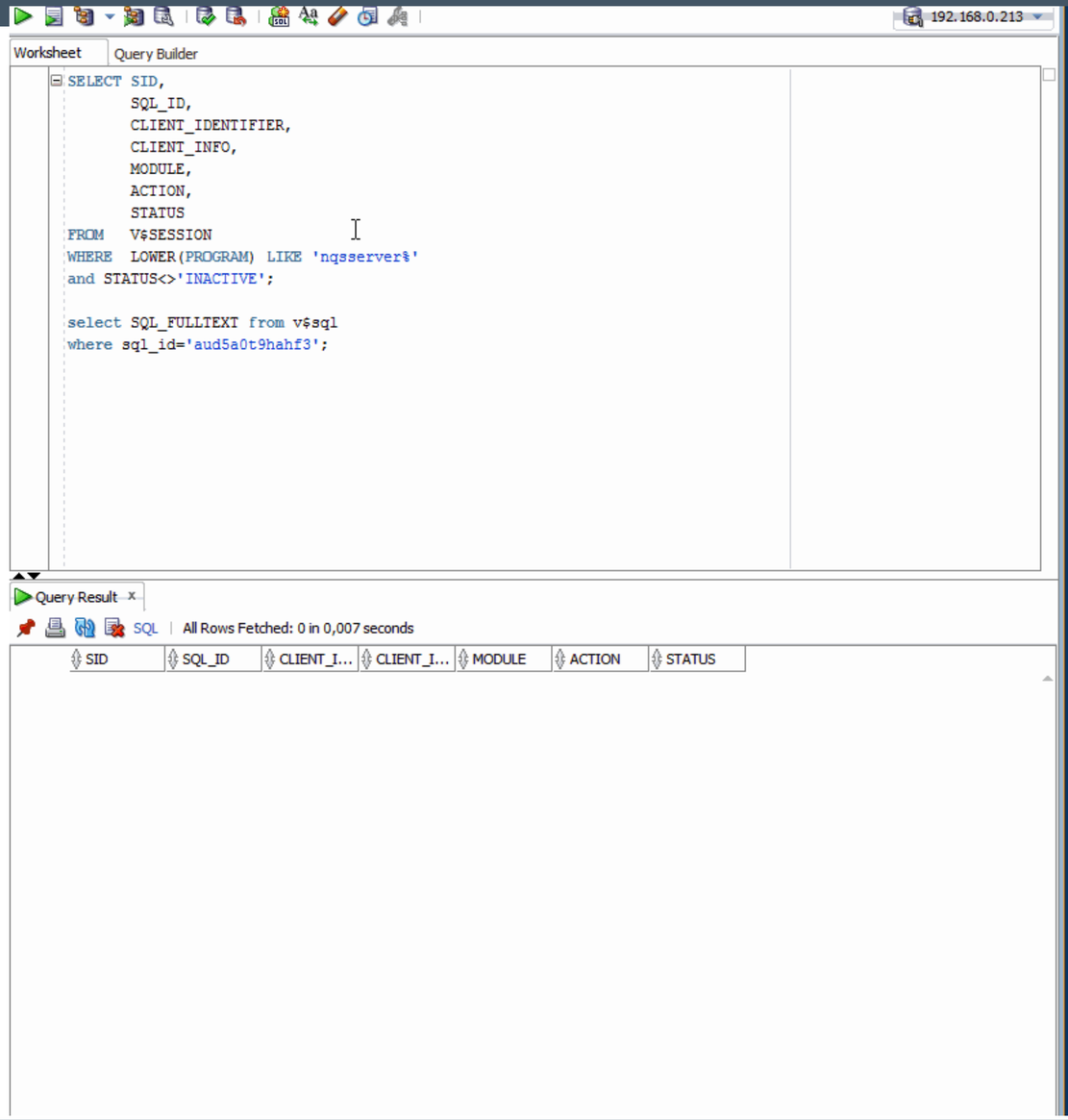
Tracing OBIEE Performance into the Oracle Database

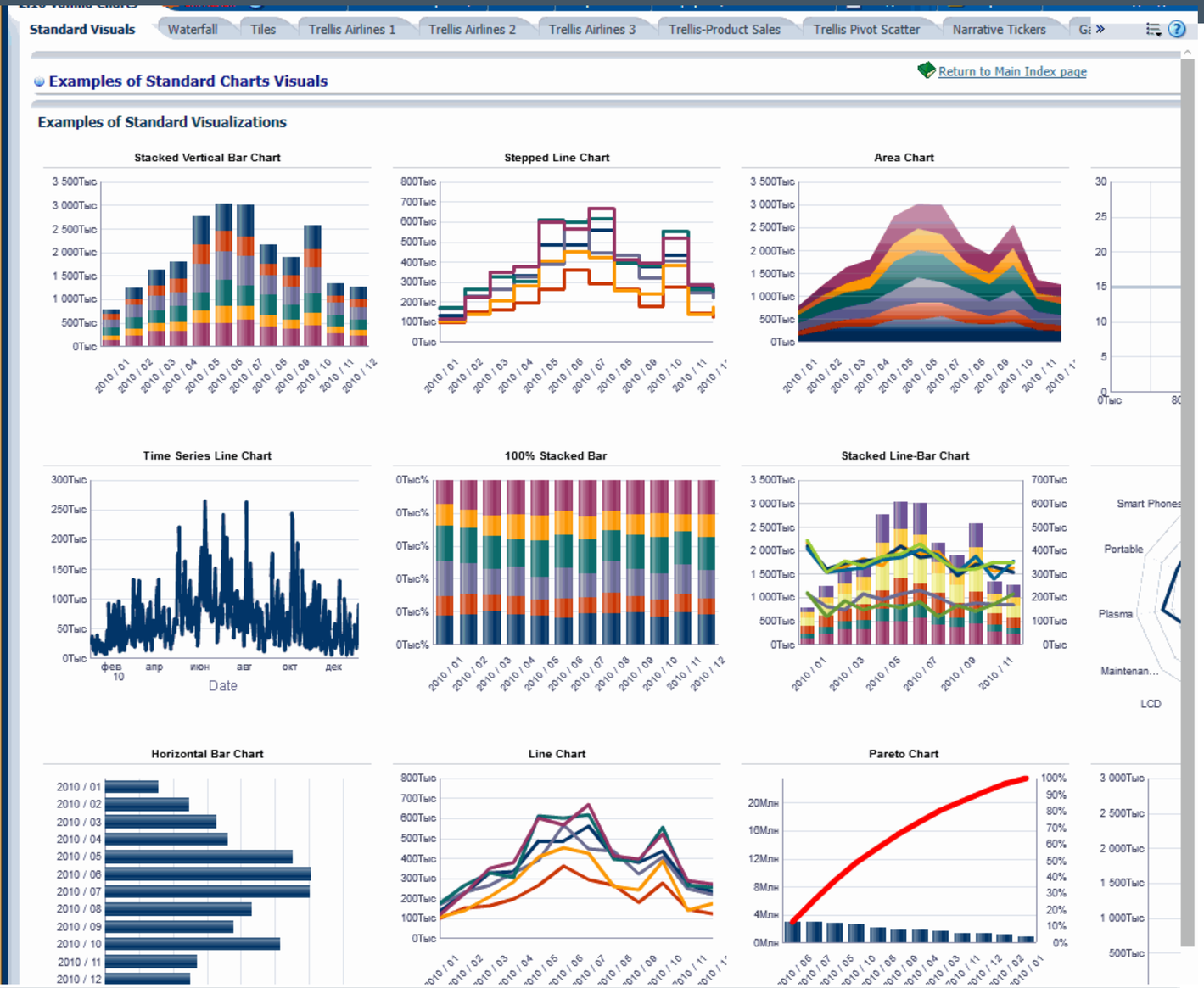
- OBIEE sets the ACTION for queries sent to Oracle DB
- Stores this as PHYSICAL_HASH_ID in Usage Tracking
- Use Usage Tracking to correlate recent database activity with OBIEE Dashboards and Users
- Generate long-term OBIEE performance analysis against AWR reports
  - Highlight “heavy” reports that use lots of I/O or CPU

http://ritt.md/obi-cp


192.168.161.129
Worksheet
Query Builder
SELECT SID,
SQL_ID,
CLIENT_IDENTIFIER,
CLIENT_INFO,
MODULE,
ACTION,
STATUS
FROM V$SESSION
WHERE LOWER(PROGRAM) LIKE 'nqsserver%'
AND STATUS<>'INACTIVE';
Query Result
SQL | All Rows Fetched: 0 in 0,003 seconds
SID
SQL_ID
CLIENT_I...
CLIENT_I...
MODULE
ACTION
STATUS

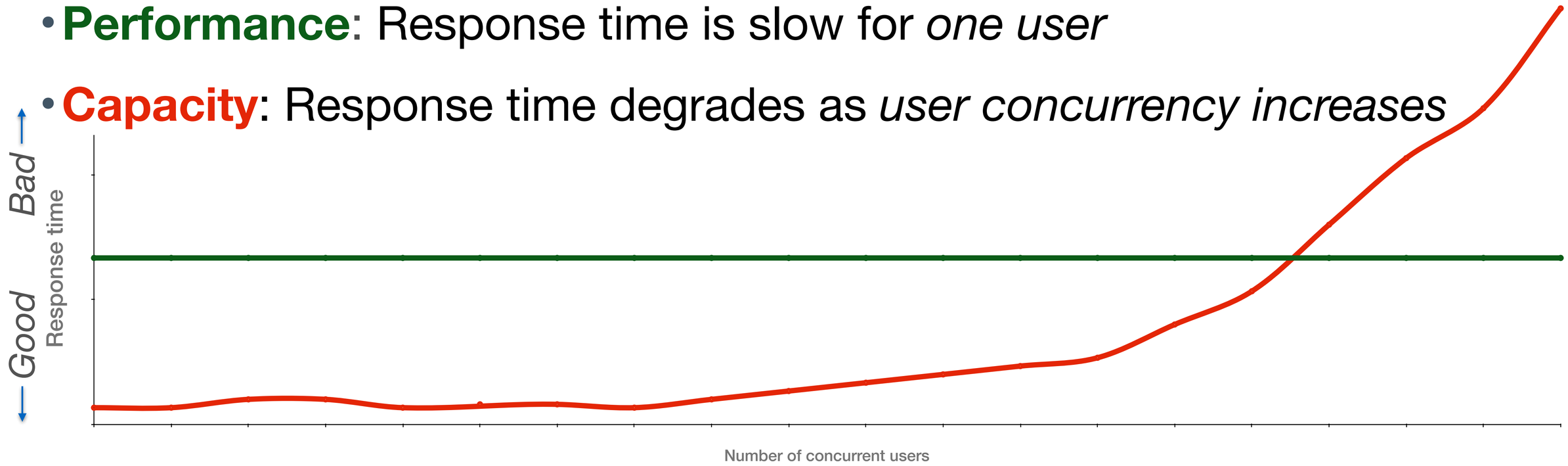

2.10 Vanilla Charts
Alerts!
Custom Link
Home
Catalog
Favorites
Dashboards
New
Open
Signed In As Paulo Rodney
Standard Visuals
Waterfall
Tiles
Trellis Airlines 1
Trellis Airlines 2
Trellis Airlines 3
Trellis-Product Sales
Trellis Pivot Scatt
Return to Mai
Examples of Standard Charts Visuals
Examples of Standard Visualizations
Stacked Vertical Bar Chart
Stepped Line Chart
Area Chart
Time Series Line Chart
Date
100% Stacked Bar
Stacked Line-Bar Chart
Horizontal Bar Chart
Line Chart
Pareto Chart


192.168.0.213
Worksheet
Query Builder
SELECT SID,
SQL_ID,
CLIENT_IDENTIFIER,
CLIENT_INFO,
MODULE,
ACTION,
STATUS
FROM V$SESSION
WHERE LOWER(PROGRAM) LIKE 'nqsserver%'
and STATUS<>'INACTIVE';
select SQL_FULLTEXT from v$sql
where sql_id='aud5a0t9hahf3';
Query Result
SQL
All Rows Fetched: 0 in 0,007 seconds
SID
SQL_ID
CLIENT_I...
CLIENT_I...
MODULE
ACTION
STATUS


Standard Visuals
Waterfall
Tiles
Trellis Airlines 1
Trellis Airlines 2
Trellis Airlines 3
Trellis-Product Sales
Trellis Pivot Scatter
Narrative Tickers
Examples of Standard Charts Visuals
Return to Main Index page
Examples of Standard Visualizations
Stacked Vertical Bar Chart
Stepped Line Chart
Area Chart
Time Series Line Chart
100% Stacked Bar
Stacked Line-Bar Chart
Horizontal Bar Chart
Line Chart
Pareto Chart
Date

Is your problem **Performance** or **Capacity**?

- **Performance**: Response time is slow for *one user*
- **Capacity**: Response time degrades as *user concurrency increases*



- Fix **Performance** problems at root cause; *adding capacity alone is generally not sensible*
- Improve the performance of an underlying **Capacity** problem and you might offset the need to add any additional capacity at all.

Performance Diagnostics Approach

- Performance
  - Build a time profile
  - Don't know where to start? Try Usage Tracking or `obis1-query.log`
    - Long running queries
    - Logical queries returning lots of data to the client
    - Logical queries returning lots of data from the DB but small % to the client
    - Logical queries requiring lots of physical queries
- Capacity
  - Examine capacity metrics (OS, DMS) *over time*
  - Correlate with reported problems

```
Queuing DMS metrics:
Oracle BI DB Connection Pool/* -> Current Queued Requests
Oracle BI PS Chart Engine -> Current Charts Queued
Oracle BI PS Query Cache -> Current Queued Queries
Oracle BI PS Thread Pools/* -> Current Jobs Queued
Oracle BI Thread Pool/* -> Current Queued Requests
```

So What Does “Good” Look Like?

This Is Not “Best Practice”

- There is no one right way : **It Depends**

> ***The only “best practice” you should be using all the time is “Use Your Brain”.***
> *— Steven Robbins / Tom Kyte*

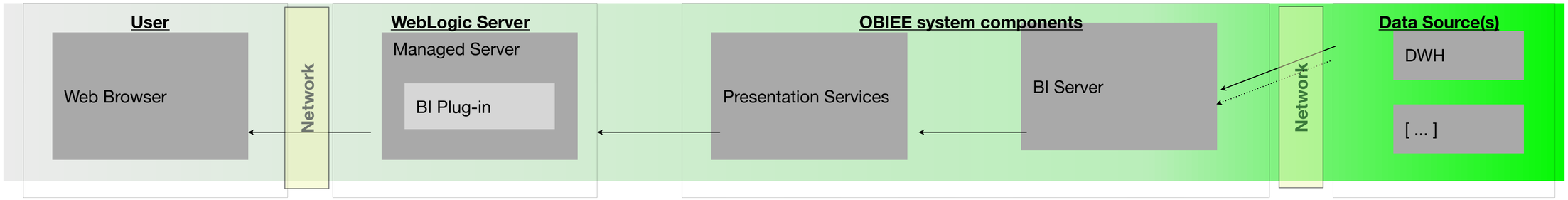
The Bucket List of Performance Gains

(h/t Greg Rahn)

- ★ Don't Do It
- ★ Do It Only Once
- ★ Do It Less Often
- ★ Do It More Efficiently

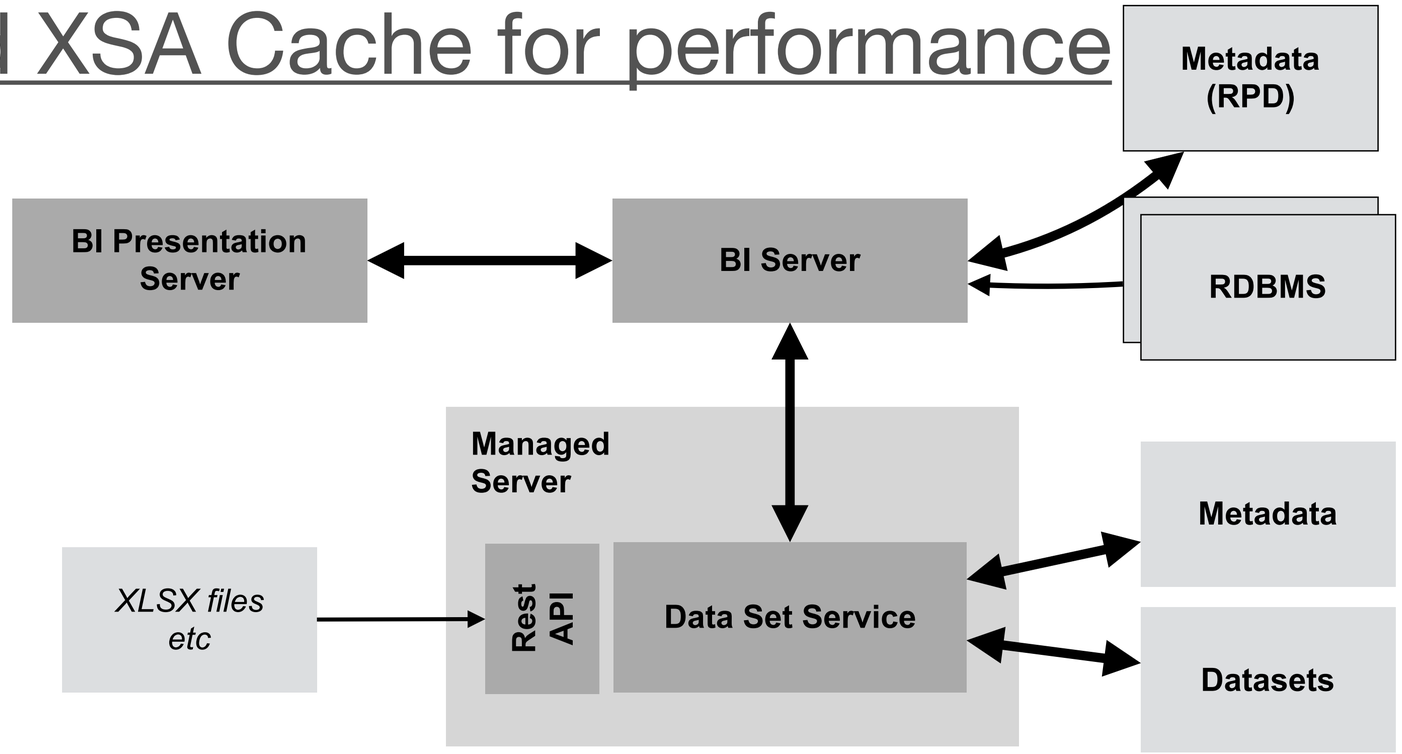
‘Database Pushdown’ (Do It More Efficiently)

- Reduce the amount of work/data handled further up the stack
  - Federation across sources can be a challenge
    - c.f. BI Server caching (http://ritt.md/bi-cache)



Data Mashups in OBIEE 12c (Do It More Efficiently)

- External Subject Areas (XSA) introduced in OBIEE 12c
- By default data is stored in **flat file on disk**
- Use the database-backed XSA Cache for performance



- More information:
  - http://ritt.md/obiee12c-xsa-dss
  - Doc ID 2087801.1

Export to Excel?

MAYBE WE SHOULDN'T DOWNLOAD MILLIONS OF ROWS WITH OBIEE?
NAH. NONSENSE. CAN'T BE THE TRUTH!
risovach.ru

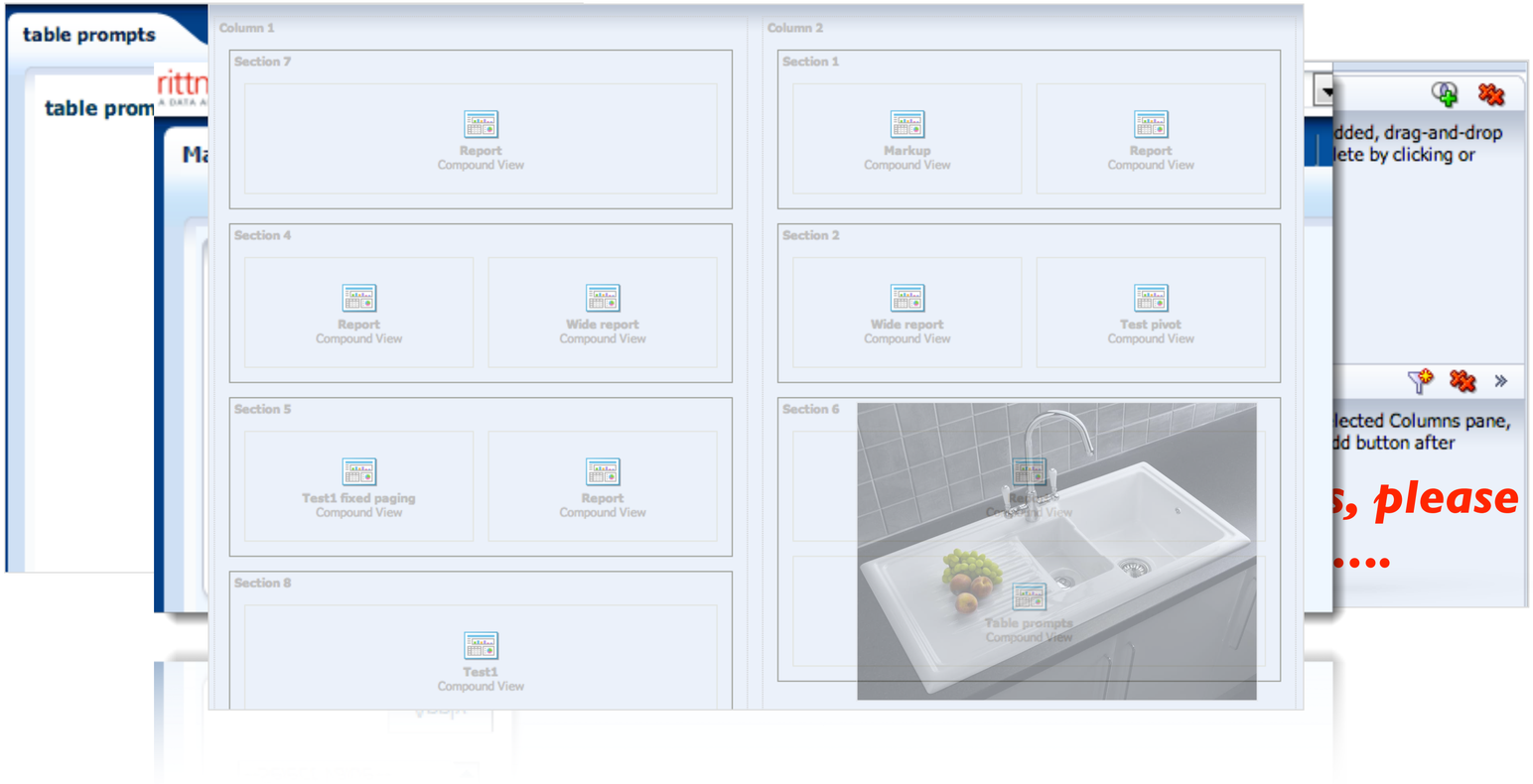
Feeding the Excel Monster (Don't Do It/Do It More Efficiently)

- What's being done with the data o
  - Could it be done in OBIEE instead?

- Alternatives to Export from An sis/D
  - Oracle have specific recommendat
    - Favour CSV export over
    - Favour BI Publisher export ov OBIE
  - Use Logical SQL against BI S ODBC/JDBC interface direct
  - Dump direct from the database

Don’t Do It / Do It Less Often

- “Filter Early”
  - Table Prompt != Filter
- Report by Exception
- Make sure Dashboards have default/mandatory prompts (http://ritt.md/obi-prompts)



- Be smart about Dashboard and Analysis design - don’t cram everything into one page
  - Less clutter : Better user experience & Better performance

Not forgetting …

- Do It More Efficiently
  - Aggregation

- Do It Less Often
  - BI Server caching (http://ritt.md/bi-cache)

- Database optimisation (partitioning, indexing, parallelism, statistics, etc)

- Balanced Hardware configuration

Rittman Mead OBIEE Performance Analytics Service

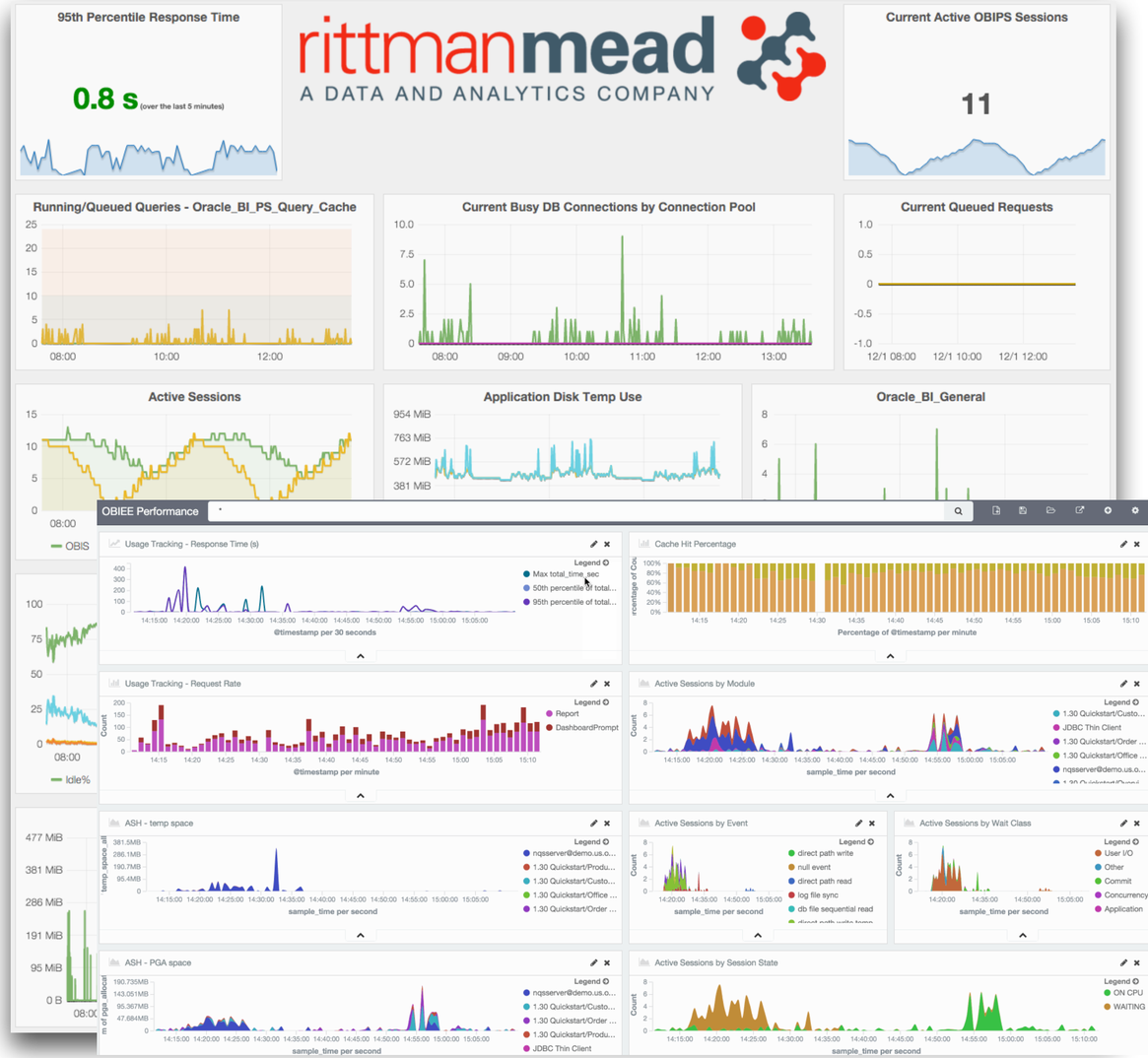
- **Understand your existing situation**
  - Performance Analytics Report
- **Fix and monitor performance problems**
  - Performance Analytics Dashboards
- **Learn Optimal Design and Performance Troubleshooting**
  - Training from the OBIEE Performance Experts

Performance Analytics Report

- Empirical performance assessment based on Usage Tracking data
- Quantify overall performance profile of OBIEE
- Identify key optimisation candidates and efficiency opportunities

Performance Analytics Dashboards

- Monitor and Troubleshoot performance problems
- Interactive dashboards for rapid analysis
- Holistic view of OBIEE in one place
  - Response Times
  - Cache usage
  - Temporary file usage
  - Database metrics (ASH)
  - OS metrics



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References & Further Reading

- Cary Millsap - "*Thinking Clearly About Performance*"
  - http://queue.acm.org/detail.cfm?id=1854041
- OBIEE Performance Analytics: Analysing the Impact of Suboptimal Report Design
  - https://community.oracle.com/docs/DOC-993649
- All You Ever Wanted to Know About OBIEE Performance…but were too afraid to ask
  - http://ritt.md/obi-performance
- obi-metrics-agent
  - http://ritt.md/oma-intro
- Greg Rahn - "*The Core Performance Fundamentals Of Oracle Data Warehousing – Balanced Hardware Configuration*"
  - http://wp.me/p3cJT-by
- Oracle documentation - "*Oracle® Database 2 Day + Data Warehousing Guide - Balanced Hardware Configuration*"
  - E25555-03